

skimmed milk differs from new milk only in having lost the butter, and butter-milk from skimmed milk only in having lost a portion of its sugar and gained a portion of acid. Hence, skimmed milk and butter-milk may be rendered nearly equal to new milk by adding a proper quantity of fat to them.

I do not think that a medium price can be selected for each of these kinds of foods, since they are purchased at the different places at different and yet fixed prices, over large areas of the country, but I will name the following:—New milk, 1d. and 2d. per pint; skimmed milk,  $\frac{1}{2}$ d.,  $\frac{3}{4}$ d. and 1d. per pint; and butter-milk,  $\frac{1}{2}$ d. and  $\frac{3}{4}$ d. per pint. At these prices the following quantities of the elements may be obtained for 1d.

	Carbon.	Nitrogen.
New milk.....1d. per pint	546 grains.....	44 grains.
“ .....2d. “	273 “	22 “
Skimm'd milk $\frac{1}{2}$ d. “	1,748 “	174 “
“ $\frac{3}{4}$ d. “	874 “	87 “
“ 1d. “	437 “	44 “
Butter-milk... $\frac{1}{2}$ d. “	2,514 “	262 “
“ ... $\frac{3}{4}$ d. “	838 “	88 “

If we select skimmed milk and butter milk at their lowest price, we find that they exceed the standard in carbon, and are very much richer in nitrogen. Even butter-milk at the highest price, and skimmed milk at its medium price, are higher than the standard in nitrogen but deficient in carbon, whilst new milk at the highest price is somewhat dearer than beef, and incomparably dearer than the standard. As the cost of milk cannot be varied by the purchaser, but each person must in his own locality pay the price demanded, it is easy to perceive how much more highly-favoured some portions of the community are than others, and how unfavourably the inhabitants of this metropolis compare with those of small towns and villages. How absurd also is the frequent habit, even among the poor, of regarding butter-milk as a food for pigs and not for man.

**WHEY.**—Whey is nowhere sold by farmers I believe, and in but few places is it regarded as a food worthy of man. It is not a rich food, for nearly all the cheese and butter have been extracted in its production, but yet each pint contains nearly 200 grains of carbon and 15 grains of nitrogen, so that it is much more economical to drink whey than water.

**CHEESE.**—Cheese is a substance particularly rich in nitrogen, and the poorest kinds of it, namely, those made from skimmed milk, contain the greatest amount of this element. It is very probable that the only real difference between skimmed milk cheese and new milk cheese, is in the absence of butter in the former, and its presence in greater or less quantity in the latter. Hence the latter will be richer in carbon, besides being more agreeable to the palate. There is a great difference in the value of these kinds of cheese, so that whilst skimmed-milk cheese is obtained at 3d. per lb., it is needful to give 8d. for a fair sample of new milk cheese; and accepting those prices we shall find the amount of carbon and nitrogen which can be obtained for 1d. as follows:—

	Carbon.	Nitrogen.
Skimmed-milk cheese ...	782 .....	122
New milk cheese.....	333 .....	40

The difference in the economic value of the two

kinds is exceedingly great, but it is not known whether both are equally digestible and appropriated by the system. It is highly probable that when more than half an ounce of cheese is eaten at a meal a considerable portion passes off unused, for in my experiments the amount of nitrogen which enters the blood when two ounces of cheese had been eaten was far less than was contained in the cheese. Admitting, then, that there is a waste of material whenever cheese of any kind is eaten in large quantities, I doubt if there is any ground for the belief that the cheaper kinds of cheese are less digested than the other, provided the following conditions be fulfilled in both cases, viz., that the cheese be neither new nor old, but the skimmed milk cheese about 6 months, and the new milk cheese from 6 to 12 months old. If too new, the skimmed milk cheese is tough, and if too old, it is hard, and therefore in both cases it will be imperfectly masticated.

When compared with our standard, skimmed milk cheese far exceeds it in nitrogen, whilst both kinds are greatly deficient in carbon, and from this must also be taken an unknown quantity for the supposed loss in digestion. It is a great mistake in the poor to buy high priced cheese, and cheese at whatever price which is strong to the taste.

**TEA.**—Tea was largely considered by me in the paper\* which I had the pleasure of reading before this Society two years ago, and which the council honoured with a medal. It is by far the least economical of all the substances used as food, since if valued at 3d. per oz. it would not give more than 4 grains of nitrogen and an infinitesimal quantity of carbon for 1d. Hence, as affording nutriment, its purchase is most wasteful; and although it is useful by enabling the poor to drink hot water in an agreeable form, it is most desirable that its cost should be reduced to the least possible amount.

**ALCOHOLS.**—I do not propose to discuss the value of alcohols in this paper, since regarded as food they offer extremely little nutriment in proportion to their cost, and regarded as medicinal agents their worth cannot be measured by the nutritive material which they contain.

#### Summary.

I have now completed the details which I proposed to lay before you, and, in conclusion, have only to sum up the subject by showing at what cost the standard quantity of carbon and nitrogen may be obtained from the various foods which have now been considered. The standard quantity required is 1450 grains of carbon and 66 grains of nitrogen, at a cost of 1d.

#### As to the Carbon.

Maize will yield the standard quantity at a cost of  $\frac{1}{2}$ d. Buttermilk (bought at 6 pints for a penny) and barley meal at a little more than  $\frac{1}{2}$ d.; peas, green vegetables (costing  $\frac{1}{2}$ d. per lb.); potatoes (costing  $\frac{1}{2}$ d. per lb.) and oatmeal and bones, at from  $\frac{1}{2}$ d. to 1d. Fine flour, rice, butter-milk (costing  $\frac{1}{2}$ d. per pint) at from 1d. to  $1\frac{1}{2}$ d.; green bacon, skimmed milk (costing  $\frac{1}{2}$ d. per pint); dripping, green vegetables (costing  $\frac{1}{2}$ d. per lb.); treacle and skimmed milk cheese, at from  $1\frac{1}{2}$ d. to 2d.; suet, sugar and lard, at from 2d. to  $2\frac{1}{2}$ d.; new milk (costing 1d. per pint); fresh herrings and pork, at from  $2\frac{1}{2}$ d. to 3d.; mutton and skimmed milk (cost-